

**Chapter 12-7A-4**  
**URBAN WILDLAND INTERFACE BUILDING TEST STANDARDS**

**UNLOADED DECK, BURNING BRAND EXPOSURE**  
**STANDARD 12-7A-4**

**STATE FIRE MARSHAL**

**Unloaded Deck, Burning Brand Exposure**

**Sec. 12-7A-400**

- (a) **Application.** The minimum design, construction and performance standards set forth herein for unloaded decks are those deemed necessary to establish conformance to the provisions of these regulations.
- (b) **Scope.** This test method determines the performance of decks (or other horizontal appendages to structures) when exposed to burning brands. The burning brand exposure test is intended to determine the degradation modes of deck boards when exposed to a burning brand on the horizontal deck surface.
- (c) **Tested and Listed Materials.** Materials and assemblies which have been tested and listed by an approved testing agency for the intended purpose need not be individually re-tested. Such individually tested and listed materials and assemblies shall be subjected to the performance standard tests to determine their suitability for use in the deck assembly.
- (d) **Alternate Constructions.** This standard does not expressly require the use of specific materials or forms of construction. Combinations of materials and assemblies may be investigated and tested in accordance with these regulations, and if found to be substantially equivalent in performance may be given recognition for approval.
- (e) **Referenced documents.**
1. ASTM D 4933 Guide for moisture conditioning of wood and wood-based materials
  2. ASTM E 603 Standard Guide for Room Fire Experiments
  3. ASTM E108 Standard Test Methods for Fire Tests of Roof Coverings
  4. UBC 8-2 (1994) Standard test method for evaluating room fire growth contribution of textile wall coverings
- (f) **Definitions.**
1. **Deck boards.** Horizontal members that constitute the exposed walking surface of the deck.
  2. **Rate of heat release.** The net rate of energy release as measured by oxygen depletion calorimetry.
- (g) **Test Apparatus.** The ASTM E108 "A" brand roof test apparatus is to be used, with the following modifications:
1. The deck is supported horizontally with its center 60 in. (152 mm) from the front opening of the wind tunnel, the joists being parallel to the airflow and resting on two transverse metal supports. The top surfaces of these supports, no more than 3 in. wide, are at the same height as the floor of the wind tunnel. Burning fragments are free to fall the floor of the room.
  2. Wind speed is measured as in ASTM E108, but with the deck in its test position at 60 in. (152 mm) from the front opening of the wind tunnel.
  3. At the beginning of the test, the burning brand is centered laterally on the deck with its front edge 2.5 in. (64 mm.) from the front edge of the deck.
- (h) **Materials.**
1. All deck board materials are to have the cross-sectional dimension equivalent to use in service.

2. Commercially available products are to be obtained from a wholesale or retail supplier, not directly from the manufacturer.
3. The deck board material, if not solid wood, may be analyzed for material composition.
4. If solid wood deck boards are used, the species is to be determined.  
Note: If the material is "plastic lumber" or other composite such characteristics shall include the type and amounts of the plastic(s) and the wood-plastic ratio.
5. All materials are to be conditioned to equilibrium to 6% EMC conditions prior to testing as specified in ASTM D4933.

(i) **Test Assembly.**

1. **Size.** The overall size of the test deck shall be 2 x 2 ft. (610 x 610 mm.) unless width variation of deck boards requires an increase in overall deck width (i.e., the direction of joists) in order to meet the overall dimensions. The length of individual deck boards shall be 2 ft (610 mm).
2. **Joists.** The deck is supported by two sets of 2 x 6 in. Douglas fir joists, 28.1 in. (712 mm.) long, and constructed with a 16-in. (406 mm.) center-to-center spacing. The joists shall be conditioned to 6% EMC. Note: A comparable species that may be more commonly used for structural framing of decks in a given region can be substituted for Douglas-fir.
3. **Deck board spacing and fastening.** Edge-to-edge spacing is 3/16 in. (5 mm.), with boards attached to the joists with 2-in. (50 mm) deck screws inserted into deck boards spaced 1.5 in. (38 mm.) from the front and back edges of the deck boards. The front deck board shall be flush with the ends of the joists, and the rear deck board shall overhang the end of the joists by 1 in. (25 mm.).
  - i) Note: Boards manufactured for tongue and groove edge connections are to be spaced as per the manufacturer's recommendation.
  - ii) Note: Alternate fastening schedules can be used if specified by the deck board manufacturer.
  - iii) Note: If nominal 2 x 6 in. deck boards are used, a total of 5 boards shall be used for each deck. Changing the board width could change the number of deck boards in the deck.

(j) **Conduct of Tests.** The burning brand test evaluates the performance of decking material with a burning "A" brand (2 kg) placed on the deck surface and subjected to a 12 mph (322 m/s) wind.

1. **Procedure.** Adhere to ASTM E108 "Standard Test Methods for Fire Tests of Roof Coverings" (burning brand test, "A" brand), with apparatus modified as described above in "Test Apparatus" and procedure modified as follows:
  - i) **Air Velocity.** The air velocity shall be calibrated using the 60-in. (1530 mm) framework spacing. All other measurement details shall be followed as specified in sections 4.4.2, 4.4.3, and 4.4.4 of ASTM E 108-00. Note: ASTM E 108-00 specifies calibration to be conducted with the 33-in. (840 mm) framework spacing used for the intermittent flame test set up. Tests conducted at the UCFPL showed that at the nominal 12 mph setting, a difference in measured velocity between the 33- and 60-in. framework spacing was not discernible.
  - ii) **Brand Ignition.** The ignition procedure of the "A" brands shall be as specified in Section 9.4 of ASTM E 108-00, with the exception that the ignition sequence shall be as follows:
    - (1) Each 12 x 12-in. face for 30 seconds
    - (2) Each 2.25 x 12-in. face for 30 seconds
2. **Observations.** The physical changes of the deck boards shall be noted during the test, including deformation from the horizontal plane, location of flaming and glowing combustion, cracks or checks, and loss of material (i.e, flaming drops of particles falling from the deck). Note: It is desirable to capture the entire test with a video recorder to allow review of the details of performance.
3. **Termination.** The test shall be terminated immediately if 1) flaming or glowing combustion of the deck boards stops, if 2) flaming combustion accelerates rapidly (runaway combustion), if 3) a board collapses or if 4) 40 min elapses.
4. **Report** a description of the deck board material, the time of any observation of degradation (accelerated combustion, board collapse, flaming drops or particles falling from the deck), peak net heat release, and net heat release rate during the course of the test, and any other observations during the test.

(k) **Conditions of Acceptance.**

1. **Duration of burning brand exposure.** *To pass this test standard, the deck materials and assembly shall withstand "A" burning brand exposure in accordance with the requirements of ASTM E-108-00 as modified herein, with the absence of structural failure or sustained combustion of any kind.*
2. **Sustained Combustion** *of any kind noted within the specified test period shall constitute failure of this test standard.*

DRAFT